by MARIOS ADAMOU, MD, MSc, LLM, CM, PGCE, MRCPsych

Dr. Adamou is with the Kent Institute of Medicine and Health Sciences, Research and Development Centre, University of Kent, Canterbury, England

Community Service Models for Schizophrenia: Evidence-Based Implications and Future Directions

ABSTRACT

Schizophrenia is a chronic relapsing and remitting mental illness with lifetime prevalence between 0.40 to 1.4 percent. Most people with schizophrenia are treated in psychiatric units of local general hospitals for short periods of time when acutely ill. With the worldwide trend toward closure of asylums and institutions in the 1950s, there has been an increasing focus on treatment in the community. Community mental health teams (CMHT) are the kernel of community treatment. Although their composition and *modus operandi* differ according to patient need, all models claim superiority over outcomes of long inpatient stay. Case management, assertive outreach, and crisis resolution sometimes compete for resources. What is the evidence for their efficacy? What is the right mix of their use? As we discuss these, we propose that there may be room for the application of established industry models of service delivery, such as Just-in-Time (JIT), in the treatment of patients with schizophrenia.

ADDRESS CORRESPONDENCE TO:
Dr. Marios Adamou, Kent Institute of Medicine and Health Sciences, Research and Development Centre, University of Kent, Caterbury, Kent CT2 7PD England; Phone 44-1227865815; Fax: 44-1227812125; E-mail: m.adamou@kent.ac.uk

INTRODUCTION

Schizophrenia is a common and debilitating illness characterized by chronic psychotic symptoms and psychosocial impairment that exact considerable human and economic costs. As with other severe psychiatric illnesses (e.g., bipolar affective disorder), its course is chronic and phasic. However, after initial treatment, people with schizophrenia usually experience long periods of relative stability.[1] Relapses can occur due to exposure to environmental stressors or poor patient adherence with medication.

During a psychotic relapse, sufferers experience a sudden exacerbation of acute symptoms, such as delusions and hallucinations, and consequently may have disturbed and difficult behavior. In extreme cases, some individuals become aggressive, threatening harm to either themselves or others. Intervention at this stage is crucial, as it brings much needed relief for both the sufferer and his or her lay caregivers and can help prevent further deterioration.[2]

In the late 1970s, as a response to the closing of big asylums and subsequent need for community care, a number of service models were developed to provide community care to patients with a chronic mental illness, such as schizophrenia.[3] All models are more or less based on the same platform: a multidisciplinary team servicing the needs of a patient. However, these models' operational modes differ from one another significantly. As a result, the generic models of case management, assertive community treatment (ACT), and crisis resolution were developed. Although these models have been around for a few years, their weaknesses are not widely known. I will present the evidence base for each model, discuss the limitations of each for clinical practice, and present some suggestions for future change.

CASE MANAGEMENT

Case management is a means of co-coordinating the care of severely mentally ill people in the community. Case management is not the same as Assertive Community Treatment (ACT), which we will discuss later. Their goals, however, such as keeping patients in contact with services,[4] reducing the frequency and duration of hospital admissions and hence costs,[5,6] and improving outcome, especially social functioning and quality of life,[7] are shared.

With case management, each mentally ill person is assigned a 'case manager.' The case manager is expected to assess that person's needs, develop a care plan, arrange for suitable care to be provided, monitor the quality of the care provided, and maintain contact with the person. The case manager may be a registered psychiatric nurse, a social worker, or an occupational therapist.[7]

Despite the advocacy for case management, particularly in the United Kingdom, the multiplicity of its forms and varieties is notorious[8] and the evidence of its usefulness controversial. For example, although case management is more effective than standard care in helping patients maintain contact with services, the size of the effect is small: case management must be given to 14 patients before one extra patient remains in contact. Furthermore, case management approximately doubles the rate of hospital admissions relative to standard care. Four out of six trials,[9–14] including the two largest conducted so far,[9,10] also suggest that case management increases the duration of hospital admissions.

Although case management increased patient adherence in one UK study where the case-managed patients with psychotic illness, followed up for 18 months, had more contacts with all forms of health and social care, it looks unlikely that case management produced substantial improvement in clinical or social outcome. When mental state is assessed using the Brief Psychiatric Rating Scale, case management is shown not to produce a clinically significant improvement.[15] Similarly, clinically significant improvements in social behavior and quality of life look unlikely. The nonsignificant trend for increased mortality under case management is probably not clinically meaningful but may reflect that case managers were more likely to know if a patient has died by virtue of maintaining better contact. It is still unclear whether case management affects rates of imprisonment.[16]

Reducing costs does not appear

Despite the advocacy for case management, particularly in the UK, **the multiplicity of its forms and varieties** is notorious and the evidence of its usefulness controversial.

to be a strong point of the case management model. Three summary measures of cost were taken into consideration: 1) mean weekly costs of psychiatric hospital care; 2) mean weekly costs of healthcare (including all medical care, all psychiatric care, and the costs of case management, but excluding accommodation other than hospital care); and 3) mean weekly costs of all care (including costs of accommodation and subtracting benefits, such as earnings, where these were known). All cost data must at present be interpreted with caution because costing is a complex area that requires analysis of individual patient data before definitive conclusions can be drawn. At present, studies providing data on one or more of these summary measures[15,17–19] suggest that case management results in substantially increased costs for healthcare providers. On the other hand, when all costs to society are considered, there is a suggestion[14] that case management might bring about a small reduction in costs.

ASSERTIVE OUTREACH: ASSERTIVE COMMUNITY TEAMS

Assertive outreach is often confused with case management. Both models evolved at the same time in response to the same problem: institutionalization of chronically ill patients. Case management is far more widely practiced than ACT.[20] There are two key differences between ACT and case management. The first difference is that ACT emphasizes team working and team responsibility with the vital link being between the team and the client group and not between individual team members and particular clients.[21–23] By contrast, case management emphasizes professional autonomy and individual responsibility with the vital link being between a single case manager and his or her 'case load of clients.'[24,25] This means that ACT team members share responsibility for the sick individuals in their care, whereas case managers carry individual case loads.[26–30]

The second difference is that ACT teams attempt to remain faithful to the specified model described above whereas case management practice is guided only by broad theoretical concepts.[20] While some case managers may adopt elements of the ACT model, case management generally has little in common with ACT.[23,26] The four main reported indices of outcome of ACT are the numbers maintaining contact with the psychiatric services, the extent of psychiatric hospital admissions, the clinical and social outcomes, and costs.

In terms of numbers admitted to hospital, ACT is superior to standard care and hospital-based rehabilitation[27,31–34] and consistently superior in reducing mean stay days in hospital compared to standard care, hospital-based rehabilitation, and case management. Patients of ACT teams were significantly less likely to be admitted to hospital than those in the standard community care groups (OR 0.59, 99%CI 0.41–0.85, N=1047, NNT 10.3).[35]

ACT is clearly superior to standard care based on three aspects of clinical and social outcome: accommodation,[31] employment,[27,34] and satisfaction.[32,36] However, it was not superior to standard care on measures of mental state and social functioning.[31,32,36] ACT was also superior to hospital-based rehabilitation on the accommodation aspect of social outcome, but otherwise there was insufficient data.

Specifically, the patients allocated to ACT were more likely to be living independently (OR 0.46, 99%CI 0.25–0.86, N=362, NNT=6.6) and less likely to become homeless (OR 0.24, 99%CI 0.08-0.65, N=374, NNT=10.2). Patients under the care of ACT teams spent more days in independent accommodation, fewer days homeless, and more days in stable accommodation. With respect to employment, patients cared for by ACT teams were less likely to be unemployed (OR 0.31, 99%CI 0.17-0.57, N=604, NNT 7.4). With respect to patient satisfaction, two trials [32,36] showed that ACT resulted in a more satisfied clientele on the Client Satisfaction Questionnaire (weighted mean difference -0.56, 99%CI -0.82 to -0.29, N=120).[35]

With respect to cost of inpatient care, ACT is consistently superior to standard care and case management although there is only limited data for hospital-based rehabilitation. ACT is usually, but not invariably,[37] superior to standard care and to case

ACT is only likely to achieve cost savings when applied to populations that are already **high users** of inpatient care...

management. For hospital-based rehabilitation, the limited data available favored case management. However, when inpatient costs only are considered, ACT seems cheaper than other types of care, but this cost advantage is eroded when the costs of all healthcare are considered, because costs of all healthcare include the direct treatment costs of providing ACT. This pattern implies that ACT is an expensive treatment,[38] and its cost advantage over other forms of care depends on achieving a substantial relative reduction in the duration of inpatient admissions. Therefore, ACT is only likely to achieve cost savings when applied to populations that are already high users of inpatient care, and ACT service design should target this patient population.[35]

CRISIS INTERVENTION

Breaking the cycle of repeated hospitalizations required the development of some form of community care that could adequately treat psychiatric crises in the home environment. Psychiatric services in Amsterdam were at the forefront of such treatment introducing a 24-hour 'first-aid' emergency home service just after the Second World War.[39] In the 1970s, more specific crisis intervention models were introduced. Like Amsterdam's first-aid service, crisis intervention models aimed to treat psychiatric crises in the community and, if possible, avoid hospitalization or, if this was unavoidable, reduce time spent in hospital.[2] Crisis intervention models for patients with serious mental illnesses were based on models originally developed to treat normally healthy individuals in psychological crisis.

A crisis can be defined as a situation where a person experiences overwhelming stress due to a life event, such as bereavement, rape, or major illness, and finds that his or her usual coping mechanisms for everyday life break down.[40,41] Patients with severe psychiatric illnesses, such as schizophrenia, have fragile coping mechanisms. If exposed to excessive stress, these can break down and this can then lead to an exacerbation of their acute symptoms for which crisis intervention techniques may be used.[2]

The models used for crisis intervention of patients with serious mental illnesses usually, but not always, require a multidisciplinary team of specifically trained staff. These teams may be available 24 hours a day. Crisis intervention models advocate prompt detection of exacerbation of serious mental illness followed by swift, time-limited, intense treatment delivered in a community setting. Immediate assessment and identification of problems is followed by initial implementation of treatment. Treatment usually involves a combination of medication, counseling plus practical help with living skills, and support for close family members. After the crisis has stabilized, sufferers are carefully introduced to other models of care more suited to the chronic phases of psychiatric illnesses. Where possible, crisis intervention models are designed to prevent hospitalization, further deterioration of symptoms, and stress experienced by relatives and others involved in the crisis situation.

Since their introduction, several crisis programs have emerged, all designed to offer intensive crisis-oriented treatment to severely disturbed mentally ill patients in a variety of community settings. These include mobile crisis teams, crisis units in hospitals, crisis day treatment centers, and crisis residential programs. The expansion of crisis intervention programs has been dramatic. Crisis intervention is now the central method of treatment used in community mental health programmes in Australia and in North America.[2,42]

The rapid dissemination of crisis intervention models suggests they have been successful methods of treatment for psychiatric crises. Comparing crisis intervention versus standard care, the following outcomes were examined:[43] death or harm to patients, hospital use, leaving the study early, global and mental state, burden, patient satisfaction, and economic costs.

The evidence shows that there is no indication of any effect crisis intervention may have on harm or death rates. The hospital admission rates with home care were reduced and there were less repeat admissions by 12 months.[44–46] However, the 12-

The rapid dissemination of **crisis intervention models** suggests they have been successful methods of treatment for psychiatric crises.

month pooled data from all the trials showed 44.8 percent of those allocated to home care on presentation were admitted; this reflects the difficulty encountered by the home care teams in keeping people from admission.[43]

The results from the studies of repeat admission contain a considerable amount of heterogeneity, with one very positive study[45] affecting data from the other two studies, which found no differences in repeat admissions. Until further data are available, no decisive conclusions can be made regarding hospital readmission.

Patients treated by the home care group were more likely to stay in care for at least a year. In addition, the home care crisis group improved the global measures of outcome measured by the GAS score.[46] Some differences in behaviors, such as sociability, agitation, and disorientation, also favor the home care crisis group.[45] The specific burden on families, such as 'disruption to daily routine' (NNT 6 CI 3–30), 'physical illnesses experienced' (NNT 4 CI 2–14), and 'disruption to social life' (NNT 6 CI 3–30), favored the home care group versus standard care.[43]

Patient and relative satisfaction was higher in the home care crisis group than those allocated to standard care. This finding was consistent over several measures although all continuous measures are difficult to interpret. Only one of the scales used was validated by peer review. These data would fit with the findings relating to 'burden' and further support the suggestion that the experimental intervention is acceptable both to those with serious mental illness and to their lay caregivers.

The limited data available found home care to be significantly cheaper than standard care. However, data was difficult to interpret because of the typical finding of mental health evaluations of right-skewed cost distributions (a small number of patients incurring disproportionate costs) and large standard deviations.

IMPLICATIONS FOR PRACTICE

One would assume that community services for patients with chronic mental illness are developed on the basis of valid scientific evidence. This does not always appear to be the case. Although the four main claims made for case management are not entirely evidence based,[47] case management is widely practiced. For example, the first claim that it helps maintain contact with patients is probably correct, although the advantage over standard care is small. The second claim that it reduces hospital admissions[6] is wrong because in fact it increases them. This may not be due to failure of the system but rather due to better identification of patients becoming unwell. However, the patients studied stayed longer in hospital overall. The third claim that case management improves outcome is probably wrong, at least as far as mental state, social functioning, and quality of life are concerned, but at least it does not make patients worse. The fourth claim that case management reduces costs remains unproven.

This lack of evidence did not stop policy makers in the UK from making case management mandatory for all patients with severe mental disorders. In the UK, the statutory introduction of case management has been unfortunate for two reasons: 1) health and social services have been forced to practice an intervention with a main effect likely to increase demand for hospital beds; and 2) the obligatory nature of the Care Programme Approach has fossilized community care in an ineffective mode while impeding attempts to develop superior alternatives.

If case management does not work, what is to be done? Should policy makers, clinicians, and consumers encourage the setting up of ACT teams? ACT is in its own right expensive, so policy makers must consider how new ACT teams can be financed. Would rationing the ACT service be useful? The evidence suggests that by providing ACT only to high users of psychiatric in-patient care, ACT teams are self-financing. In addition, transforming less effective forms of community care, such as case management, to ACT may contribute to the savings.

Why then is ACT not more widely practiced? There are three main reasons. First, ACT, when correctly practiced, is an expensive treatment with high start-up costs. It is, therefore, of limited appeal to the short-sighted policy maker, who will tend to seek a cheaper alternative. Second, ACT, for cost reasons, tends to be restricted to high users of in-patient services, whereas case management can be offered to all patients and is seen as more inclusive and, therefore, politically preferred. Third, many proponents of case management believe that the research evidence supports their current practice—a belief that cannot be substantiated by the evidence base.

ACT is an effective way of caring for severely mentally ill patients in the community. It maintains contact with severely mentally ill patients, reduces the use of in-patient care, and improves some aspects of outcome. ACT is popular with recipients of care and seems to be an attractive way of working for many clinicians. ACT teams could prove particularly useful in environments where psychiatric in-patient care is at a premium.

The effects of crisis intervention are difficult to comment on,

since the data on it implemented in a 'pure' form do not exist. Crisis intervention has been evaluated on top of an ongoing package of community-based care, and its conclusions, therefore, apply to this package as a whole. If, however, it becomes part of an early intervention service, it may be of help to patients with schizophrenia, but specific psychological therapies, such as family therapy, may need to be incorporated as part of the package. At the moment, the argument that crisis intervention teams may be useful as a part of an early intervention service is weak because there are insufficient trials to draw any definitive conclusions about the usefulness of early intervention.[48]

FUTURE DIRECTIONS

The inception and implementation of models of community treatment for patients with schizophrenia have not always been robust. Some of the models are continuing to be adopted despite shaky evidence base for their usefulness, and their operational modes were developed *de novo* without much input from established management practices.

The purpose of case management, assertive management, and crisis resolution is to provide a service to patients with a chronic and enduring mental illness, such as schizophrenia. The different operational modes of these services should ideally serve a specific factor of the illness process, such as course or severity; however, at the moment, it appears that because their development is been driven 'top-up' rather than 'bottom down,' they are not focused enough in their approaches.

Just-In Time (JIT) Management. With the development or refinement of the psychological and pharmacological treatments and the change in societal attitudes toward mental illness, the delivery of service to patients should be alien from dogma and keen to embrace flexibility. By incorporating tested management methods of service delivery (e.g., JIT Management), the development of psychiatric services may gain from the knowledge base accumulated by the implementation of such methods and, therefore, be more efficient in its delivery.

The JIT process is an approach proposing to improve operational performance. It has been primarily applied to the manufacturing industry,[49] and its core elements are set-up time reduction, small lot production, level production scheduling, and preventive maintenance.[50] A more elusive area for the application of JIT is the service industry. When JIT is used in the context of a service organization, the main focus is on the amount of time it takes to deliver the service. The difference with case management, assertive outreach, and crisis resolution is that their focus is on patient-related factors, such as engagement, adherence, and hospitalization, rather than purely time factors.

The philosophy behind JIT is to continuously seek ways to make processes more efficient. The ultimate goal of JIT is to produce a good or a service without waste.[51] The main themes of JIT are total visibility, synchronization and balance, respect for people, flexibility, continuous improvement, responsibility for the environment, simplicity, and holistic approach.[52] Adopting this philosophy as the core of a community team operational mode may create a flexible and efficient system of patient service provision.

The development of novel models of community psychiatric services should be planned strategically and not reactively to satisfy short-term needs or solve problems; their usefulness should be validated before they are adopted to ensure quality of care and value of money. Changing the operational models of existing teams may be a more efficient way of delivering services to patients with schizophrenia rather than adopting new models of care.

With the development or refinement of the psychological and pharmacological treatments and the change in societal attitudes on mental illness, the delivery of service to patients should be **alien from dogma and keen to embrace flexibility.**

REFERENCES

1. Bleule M. The long-term course of the schizophrenic psychoses. *Psychol Med* 1974;4(3):244–54.
2. Weisman G. Crisis intervention. In: Bellack A (ed). *A Clinical Guide for the Treatment of Schizophrenia.* Plenum Press: New York, 1989:101–34.
3. Hoult J. Community care of the acutely mentally ill. *Br J Psychiatry*

1986;149:137–44.
4. Thornicroft G, Breakey W. The COSTAR programme 1: Improving social networks of the long-term mentally ill. *Br J Psychiatry* 1991;159:245–9.
5. Rossler W, Loffler W, Fatkenheuer B, Riecher-Rossler A. Case management for schizophrenic patients at risk for rehospitalization: A case control study. *Eur Arch Psychiatry Clin Neurosci* 1995;246(1):29–36.
6. Kanter JS. Integrating case management and psychiatric hospitalization. *Health Soc Work* 1991;16(1):34–42.
7. Holloway F. Case management for the mentally ill: Looking at the evidence. *Int J Soc Psychiatry* 1991;37(1):2–13.
8. Kluiter H. Inpatient treatment and care arrangements to replace or avoid it: Searching for an evidence-based balance. *Curr Opin Psychiatry* 1997;10:160–7.
9. Curtis JL, Millman EJ, Struening E, D'Ercole A. Effect of case management on rehospitalization and utilization of ambulatory care services. *Hosp Community Psychiatry* 1992;43(9):895–9.
10. Franklin JL, Solovitz B, Mason M, et al. An evaluation of case management. *Am J Public Health* 1987;77(6):674–8.
11. Ford R, Ryan P, Repper J, et al. Providing the safety net: Case management for people with a serious mental illness. J Mental Health 1995;4:91–7.
12. Macias C, Kinney R, Farley OW, et al. The role of case management within a community support system: Partnership with psychosocial rehabilitation. *Community Ment Health J* 1994;30(4):323–39.
13. Marshall M, Lockwood A, Gath D. Social services case-management for long-term mental disorders: A randomised controlled trial. *Lancet* 1995;345(8947):409–12.
14. Quinlivan R, Hough R, Crowell A, et al. Service utilization and costs of care for severely mentally ill clients in an intensive case management program. *Psychiatr Serv* 1995;46(4):365–71.
15. McCrone P, Beecham J, Knapp M. Community psychiatric nurse teams: cost-effectiveness of intensive support versus generic care. *Br J Psychiatry* 1994;165(2):218–21.
16. Solomon P, Draine J, Meyerson A. Jail recidivism and receipt of community mental health services. *Hosp Community Psychiatry* 1994;45(8):793–7.
17. Ford R. Intensive case management for people with serious mental illness—site 2: Cost-effectiveness. *J Mental Health* 1997;6:191–9.
18. Jerrell J. Toward managed care for persons with severe mental illness: Implications from a cost-effectiveness study. *Health Affairs* 1995;14:197–207.
19. Chan S, Mackenzie A, Jacobs P. Cost-effectiveness analysis of case management versus a routine community care organization for patients with chronic schizophrenia. *Arch Psychiatr Nurs* 2000;14(2):98–104.
20. Ellison ML, Rogers ES, Sciarappa K, et al. Characteristics of mental health case management: Results of a national survey. *J Ment Health Adm* 1995;22(2):101–12.
21. Taube CA, Morlock L, Burns BJ, Santos AB. New directions in research on assertive community treatment. *Hosp Community Psychiatry* 1990;41(6):642–7; discussion 649–51.
22. Olfson M. Assertive community treatment: an evaluation of the experimental evidence. Hosp Community Psychiatry 1990;41(6):634–41; discussion 649–51.
23. Teague GB, Drake RE, Ackerson TH. Evaluating use of continuous treatment teams for persons with mental illness and substance abuse. *Psychiatr Serv* 1995;46(7):689–95.
24. Chamberlain R, Rapp CA. A decade of case management: A methodological review of outcome research. *Community Ment Health J* 1991;27(3):171–88.
25. Solomon P. Draine J, Delaney MA. The working alliance and consumer case management. *J Ment Health Adm* 1995; 22(2):126–34.
26. Essock SM, Kontos N. Implementing assertive community treatment teams. *Psychiatr Serv* 1995;46(7):679–83.
27. Bond GR, Witheridge TF, Dincin J, et al. Assertive community treatment for frequent users of psychiatric hospitals in a large city: A controlled study. *Am J Community Psychol* 1990;18(6):865–91.
28. Anthony WA, Cohen M, Farkas M, Cohen BF. The chronically mentally ill case management--more than a response to a dysfunctional system. *Community Ment Health J* 1988;24(3):219-28.
29. Harris M, Bergman HC. Case management with the chronically mentally ill: A clinical perspective. *Am J Orthopsychiatry* 1987. 57(2):296–302.
30. Kanter J. Clinical case management: Definition, principles, components. *Hosp Community Psychiatry* 1989;40(4):361–8.
31. Lehman A.Assertive treatment for the homeless mentally ill. Presented at the 148th Annual Meeting of the American Psychiatric Association. Miami, FL: American Psychiatric Association, 1995.
32. Audini B, Marks IM, Lawrence RE, et al. Home-based versus out-patient/in-patient care for people with serious mental illness. Phase II of a controlled study. *Br J Psychiatry* 1994;165(2):204–10.
33. Bond GR, Miller LD, Krumwied RD, Ward RS. Assertive case management in three CMHCs: A controlled study. *Hosp Community Psychiatry* 1988;39(4):411–8.
34. Chandler D, Meisel J, McGowen M, et al. Client outcomes in two model capitated integrated service agencies. *Psychiatr Serv* 1996;47(2):175–80.
35. Marshall M, Lockwood A. Assertive community treatment for people with severe mental disorders. *Cochrane Database Syst Rev* 2000;(2):CD001089.
36. Morse GA, Calsyn RJ, Klinkenberg WD, et al. An experimental comparison of three types of case management for homeless mentally ill persons. *Psychiatr Serv* 1997;48(4):497–503.
37. Cost-effectiveness of intensive v. standard case management for severe psychotic illness. UK700 case management trial. UK700 Group. *Br J Psychiatry* 2000; 176:537–43.
38. Ford R, Barnes A, Davies R, et al. Maintaining contact with people with severe mental illness: 5-year follow-up of assertive outreach. *Soc Psychiatry Psychiatr Epidemiol* 2001;36(9):444–7.
39. Querido A. The shaping of community mental health care. *Br J Psychiatry* 1968;114(508):293–302.
40. Caplan G. *Principles of Preventive Psychiatry.* New York, NY: Basic Books, 1964.
41. Lindemann E. Symptomatology and management of acute grief. *Am J Psychiatry* 1944;101:141–8.
42. Finch SJ, Burgess PM, Herrman HE. The implementation of community-based crisis services for people with acute psychiatric illness. *Aust J Public Health* 1991; 15(2):122–9.
43. Joy C, Adams C, Rice K. Crisis intervention for people with severe mental illnesses. *Cochrane Database Syst Rev* 2004(4):CD001087.
44. Fenton FR, Tessier L, Struening EL, et al. A two-year follow-up of a comparative trial of the cost-effectiveness of home and hospital psychiatric treatment. *Can J Psychiatry* 1984;29(3):205–11.
45. Hoult J, Reynolds I, Charbonneau-Powis M, et al. Psychiatric hospital versus community treatment: The results of a randomised trial. *Aust N Z J Psychiatry* 1983;17(2):160–7.
46. Muijen M, Marks I, Connolly J, Audini B. Home-based care and standard hospital care for patients with severe mental illness: A randomised controlled trial. *BMJ* 1992;304(6829):749–54.
47. Marshall M, Gray A, Lockwood A, Green R. Case management for people with severe mental disorders. *Cochrane Database Syst Rev* 2000;(2):CD000050.
48. Marshall M, Lockwood A. Early Intervention for psychosis. *Cochrane Database Syst Rev* 2004;(2):CD004718.
49. Sugimori Y.Toyota production system and kanban system: Materialization of Just-In-Time and respect for human system. *International Journal of Production Research* 1997;15:553–63.
50. Schonberger RJ. *World Class Manufacturing: The Lessons of Simplicity Applied.* New York, NY: The Free Press, 1986.
51. Canel C, Rosen D, Anderson EA. Just-In-Time is not just for manufacturing: A service perspective. *Industrial Management and Data Systems* 2000;100(2):51–60.
52. Stonebraker PW, Leong GK. *Operations Strategy: Focusing Competitive Excellence.* Needham Heights, MA: Allyn and Bacon, 1994.